COMP SCI 540 section 001 Syllabus

WISCONSIN
UNIVERSITY OF WISCONSIN–MADISON

Introduction to Artificial Intelligence

COURSE INFORMATION

Introduction to Artificial Intelligence
COMP SCI 540 001 (3 Credits)
2021 Summer [1216]

Description
Principles of knowledge-based search techniques, automatic deduction, knowledge representation using predicate logic, machine learning, probabilistic reasoning. Applications in tasks such as problem solving, data mining, game playing, natural language understanding, computer vision, speech recognition, and robotics. Enroll Info: None

Prerequisite(s)
(COMP SCI 300 or 367) and (MATH 211, 217, 221, or 275) or graduate/professional standing or declared in the Capstone Certificate in Computer Sciences for Professionals

Breadths
N - Natural Science

Instruction Mode
Online Only

Section Level Com B
False

Department: Computer Sciences
College: Letters and Science

2021 Summer [1216]
Term Start Date: Monday, 17-May-2021 **Term End Date:** Monday, 6-Sep-2021

Location and Schedule: ONLINE MTWR 12:30 PM-1:45 PM
CRN: 266004280

How Credit Hours are Met

How Credit Hours are Met
This class meets for two 75-minute class periods each week over the semester and carries the expectation that students will work on course learning activities (reading, writing, problem sets, studying, etc) for about 3 hours out of classroom for every class period. The syllabus includes more information about meeting times and expectations for student work.

Regular and Substantive Student-Instructor Interaction

Participation in regularly scheduled learning sessions (where there is an opportunity for direct interaction between the student and the qualified instructor).
Provide personalized comments (in any medium) for an individual student's assignment or exam.
Actively facilitate an online discussion.
Instructor posts announcements, email, or social media check-ins about academic aspects of the class.
Provide an overview video to accompany recorded lectures.
Identify students struggling to reach mastery through observation of discussion activity, assessment completion, or even user activity and offer additional opportunities for interaction.
Use of small working/study groups that are moderated by the instructor.

Other Course Information

None.

INSTRUCTORS AND TEACHING ASSISTANTS (TAs)

Instructor

Young Wu
✉ YW@CS.WISC.EDU

Instructor Availability and Preferred Contact

Office hours: 2:00 - 3:00 PM daily.
Email: yw@cs.wisc.edu

TA Availability and Preferred Contact

None.

COURSE OUTCOMES, GRADING, and OTHER COURSE MATERIALS

Course Learning Outcomes (CLOs)

(Uninformed Search Methods) Identify the formulation of search for problem solving tasks. Understand important concepts in uninformed search. Apply the search methods on the formulated search problem.

C1-1

(Informed Search Methods) Understand important concepts in informed search. Differentiate from uninformed search. Solve the formulated search problem with the informed search method A*.

C1-2

(Local Search Methods) Identify the formulation of search for problem solving tasks. Apply the hill climbing method for local search problems. Identify and summarize the important features of the simulated annealing and genetic algorithms.

C1-3

(Game Playing) Recall the concept of games. Perform the minimax game playing method on formulated game tasks. Apply alpha-beta pruning to speed up the minimax method.

C1-4

(Unsupervised and Supervised Learning) Identify and summarize important features about supervised learning and unsupervised learning. Differentiate between the two types of tasks.

C1-5

(Classic Learning Methods) Apply linear regression, hierarchical agglomerative clustering algorithm, k-means clustering, or K nearest neighbor algorithm on given problem instances. Judge if the method is appropriate for a given task.

C1-6

(Neural Networks and Deep Learning) Apply Perceptron learning rule on given problem instances. Implement neural networks using given software packages.

C1-7

(Reinforcement Learning) Understand the concepts of reinforcement learning. Identify and summarize its important features. Compute value function and Q function. Apply value iteration and Q learning on given problems.

C1-8

Grading

Programming assignments: 6 in total, 8% each, drop the lowest one.
Exams: 2 in total, 30% each.
Written assignments: 12 in total, at most 1% each, drop the lowest two, can be used to replace 10% of the weight of the exams.
Quizzes (and online discussions): 24 in total, at most 0.5% each, drop the lowest four, can be used to replace 10% of the weight of the exams.

Course Website, Learning Management System and Digital Instructional Tools

Course website: http://pages.cs.wisc.edu/~yw/CS540S21.htm

Discussion Sessions

None.

Laboratory Sessions

None.

Required Textbook, Software, & Other Course Materials

Optional text book: Artificial Intelligence: A Modern Approach by Stuart Russell and Peter Norvig.
Optional text book: Understanding Machine Learning: From Theory to Algorithms by Shai Shalev-Schwartz and Shai Ben-David.
Optional software tools: Java or Python.

Homework & Other Assignments

There are weekly written and programming assignments.
The assignments are submitted on Canvas.

EXAMS, QUIZZES, PAPERS & OTHER MAJOR GRADED WORK

Exams, Quizzes, Papers & Other Major Graded Work

There are 24 quizzes, one during each lecture.
There are two exams, one on July 19, July 20, and the other on August 11, August 12.
The quizzes and exams are non-cumulative, open-book, open-note, and the students can access electronic devices.

General Reminders for Remote Exams

The exam questions are randomized based on student ID.

ADDITIONAL COURSE INFORMATION AND ACADEMIC POLICIES

🏛 Privacy of Student Information & Digital Tools: Teaching & Learning Analytics & Proctoring Statement

The privacy and security of faculty, staff and students' personal information is a top priority for UW-Madison. The university carefully reviews and vets all campus-supported digital tools used to support teaching and learning, to help support success through learning analytics, and to enable proctoring capabilities. UW-Madison takes necessary steps to ensure that the providers of such tools prioritize proper handling of sensitive data in alignment with FERPA, industry standards and best practices.

Under the Family Educational Rights and Privacy Act (FERPA – which protects the privacy of student education records), student consent is not required for the university to share with school officials those student education records necessary for carrying out those university functions in which they have legitimate educationl interest. 34 CFR 99.31(a)(1)(i)(B). FERPA specifically allows universities to designate vendors such as digital tool providers as school officials, and accordingly to share with them personally identifiable information from student education records if they perform appropriate services for the university and are subject to all applicable requirements governing the use, disclosure and protection of student data.

🏛 Privacy of Student Records & the Use of Audio Recorded Lectures

See information about privacy of student records and the usage of audio-recorded lectures.

Lecture materials and recordings for this course are protected intellectual property at UW-Madison. Students in this course may use the materials and recordings for their personal use related to participation in this class. Students may also take notes solely for their personal use. If a lecture is not already recorded, you are not authorized to record my lectures without my permission unless you are considered by the university to be a qualified student with a disability requiring accommodation. [Regent Policy Document 4-1] Students may not copy or have lecture materials and recordings outside of class, including posting on internet sites or selling to commercial entities. Students are also prohibited from providing or selling their personal notes to anyone else or being paid for taking notes by any person or commercial firm without the instructor's express written permission. Unauthorized use of these copyrighted lecture materials and recordings constitutes copyright infringement and may be addressed under the university's policies, UWS Chapters 14 and 17, governing student academic and non-academic misconduct.

🏛 How to Succeed in This Course

Resource links to other campus services:

- University Health Services
- Undergraduate Academic Advising and Career Services
- Office of the Registrar
- Office of Student Financial Aid
- Dean of Students Office

🏛 Course Evaluations

Students will be provided with an opportunity to evaluate this course and your learning experience. Student participation is an integral component of this course, and your confidential feedback is important to me. I strongly encourage you to participate in the course evaluation.

Digital Course Evaluation (AEFIS)

UW-Madison uses an online course evaluation survey tool, AEFIS. In most instances, you will receive an official email two weeks prior to the end of the semester when your course evaluation is available. You will receive a link to log into the course evaluation with your NetID where you can complete the evaluation and submit it, anonymously. Your participation is an integral component of this course, and your feedback is important to me. I strongly encourage you to participate in the course evaluation.

Students' Rules, Rights & Responsibilities

During the global COVID-19 pandemic, we must prioritize our collective health and safety to keep ourselves, our campus, and our community safe. As a university community, we must work together to prevent the spread of the virus and to promote the collective health and welfare of our campus and surrounding community. Rights & Responsibilities

UW-Madison Badger Pledge

Campus Guidance on the use of Face Coverings

Face coverings must be correctly worn on campus at all times and in all places (both outside and inside), except by students in their assigned residence hall rooms; by employees when alone in a private, unshared lab or office; when traveling alone in a private vehicle; and when exercising outside in a way that maintains 6 feet of distance from other people.

Students with disabilities or medical conditions who are unable to wear a face covering should contact the McBurney Disability Resource Center or their Access Consultant if they are already affiliated. Students requesting an accommodation unrelated to disability or medical condition, should contact the Dean of Students Office.

Students who choose not to wear a face covering may not attend in-person classes, unless they are approved for an accommodation or exemption. All other students not wearing a face covering will be asked to put one on or leave the classroom. Students who refuse to wear face coverings appropriately or adhere to other stated requirements will be reported to the Office of Student Conduct and Community Standards and will not be allowed to return to the classroom until they agree to comply with the face covering policy. An instructor may cancel or suspend a course in-person meeting if a person is in the classroom without an approved face covering in position over their nose and mouth and refuses to immediately comply.

Quarantine or Isolation Due to COVID-19

Student should continually monitor themselves for COVID-19 symptoms and get tested for the virus if they have symptoms or have been in close contact with someone with COVID-19. Student should reach out to instructors as soon as possible if they become ill or need to isolate or quarantine, in order to make alternate plans for how to proceed with the course. Students are strongly encouraged to communicate with their Instructor concerning their illness and the anticipated extent of their absence from the course (either in- person or remote). The instructor will work with the student to provide alternative ways to complete the course work.

Diversity & Inclusion Statement

Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.

Academic Integrity Statement

By virtue of enrollment, each student agrees to uphold the high academic standards of the University of Wisconsin-Madison; academic misconduct is behavior that negatively impacts the integrity of the institution. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these previously listed acts are examples of misconduct which may result in disciplinary action. Examples of disciplinary action include, but is not limited to, failure on the assignment/course, written reprimand, disciplinary probation, suspension, or expulsion.

Accommodations for Students with Disabilities

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty, will work either directly with the student or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. (See: McBurney Disability Resource Center)

Academic Calendar & Religious Observances

See: https://secfac.wisc.edu/academic-calendar/#religious-observances